ENVIRONMENTAL ASSESSMENT
EA : OR-128-99-15

A Proposal for Culvert Replacement
Through Jobs-In-The -Woods Funding
In the Boulder Creek Analysis Area

Proposed this 21st Day of July, 1999

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SECTION I - PURPOSE OF AND NEED FOR ACTION

Purpose

The Bureau of Land Management (BLM) is authorized through Section 124 of the Omnibus Consolidated Appropriation Act of 1997 to enter into watershed restoration and enhancement agreements that restore and maintain fish, wildlife, and other biotic resources on private land to benefit these resources on public land within the watershed. The intent of this project is to partner with South Coast Lumber through the South Coast Watershed Council, to remove an undersized culvert that is currently an upstream passage barrier at all life stages for fish and other aquatic organisms. The proposed culvert replacement project was evaluated using the Minimum Requirements and Evaluation Criteria outlined in Instruction Memorandum No. 97 (USDA, 1997) and determined to have a benefit to biological resources on public lands. The project is a cooperative between the South Coast Watershed Council, South Coast Lumber and the BLM through cost-sharing and contribution of goods and services.

Fish species affected by the proposed project:

- ✧ Southern Oregon California Coastal Chinook (Proposed Threatened)
- ✧ Southern Oregon Northern California Coho (Threatened Evolutionarily Significant Unit)
- ✧ Klamath Mountain Province Steelhead (Candidate)
- ✧ Coastal Cutthroat Trout (Candidate)

The BLM, in conjunction with other Federal land agencies, is directed to conduct Watershed Analysis and restoration projects to aid in the recovery of water quality and aquatic, riparian, and terrestrial habitats. This guidance comes directly from *Coos Bay District Resource Management Plan* (RMP), *Environmental Impact Statement (*EIS) and its *Record of Decision* (ROD) (BLM, 1995). A Watershed Assessment completed by the South Coast Watershed Association provides a landscape level analysis for the project area (Wilson, 1994). This following culvert replacement is directly related to several management recommendations from that analysis. This project is located on private land and is subject to the Oregon Forest Practices Act and the Oregon Plan for Salmon and Watersheds.

The purpose of the environmental assessment is to:

- ✧ assess any potential environmental impacts resulting from implementation of either the No-action or Proposed Action,
- ✧ identify appropriate mitigation measures, and
- ✧ document the decision-making process.

Additional specialist reports and analysis documents are contained in the analysis file, hereby incorporated by reference.

Need

The Euchre Creek Watershed Assessment (1994) identified several conditions present to focus initial restoration efforts within the watershed. Poor fish spawning and rearing habitat were among several noted. The undersized culvert at Boulder Creek is an upstream passage barrier for aquatic organisms, including adult fish to historic spawning grounds, and limits refuge for juvenile fish from high flows and

extreme stream temperatures.

Undersized culverts and the fill surrounding them have a high potential to fail during heavy precipitation events. Such a failure could lead to excessive sedimentation in the aquatic system. The culvert at Boulder Creek is undersized for the flow regime (climate and basin area combined) with a large deposition of sediment upstream. The Euchre Creek Watershed Assessment (1994) recognized that the movement of sediment and excess silt was already compromising spawning habitat within the watershed. The removal of the existing culvert would restore the natural sediment regime, and bottom configuration of the channel.

The goals of the proposed project are to:

- ✧ restore access to cold water refuge and spawning/rearing habitat for anadromous and resident salmonids, and
- ✧ restore natural sediment regime, bottom configuration, and hydrologic flow under which aquatic ecosystems evolve.

Identified Issues and Resolutions

The following issues were identified by the interdisciplinary team (IDT) assigned to analyze the proposed project:

Issue 1: **Is there a concern with fish passage and spawning habitat with the existing culvert on site at the 35-14-10.0 road crossing on Boulder Creek?**

Resolution: ID team member Michael Kellett (Myrtlewood RA, Fisheries Biologist) determined the undersized culvert is indeed an upstream passage barrier for aquatic organisms, including adult fish to historic spawning grounds, and limits refuge for juvenile fish from high flows and stream temperatures. During the winter, velocities within the culvert, or the drop at the outfall (both of which vary with flow), confine adult anadromous salmonids from accessing suitable spawning habitat in Boulder Creek. During the summer, a 6-8' drop at the culvert outlet limits the dispersal of juvenile salmonids and restricts access to important cold-water refuge habitat in Boulder Creek.

Issue 2: **Is there a concern with the flush of sediment that will be delivered to the aquatic system when the existing culvert is removed?**

Resolution: ID Team members agreed that the flush of sediment is a legitament concern on the aquatic system if the culvert was to be pulled. Team members Dan Carpenter (Myrtlewood RA, Hydrologist) and Dale Stewart(Myrtlewood RA, Soil Scientist, along with the BLM District engineer, Don Porior, designed a step down transition channel (a gradient control structure) to provide a limited release of the accumulated sediment to protect the aquatic habitat downstream.

SECTION II - ALTERNATIVES INCLUDING THE PROPOSED ACTION

No Action Alternative

Description
Leave the current culvert in position and maintain the passage and undersized barrier in place.

Proposed Action - Flatcar-Style Bridge

Description
The Proposed Action would replace the existing culvert and associated fill at the 35-14-10.0 road crossing on Boulder Creek with a flatcar-style bridge. This action would involve the construction of a gradient control structure in the form of a step down channel to provide a limited release of the accumulated sediment upstream. The step down channel would be constructed out of boulders keyed into the streambed and banks to maintain channel equilibrium. Without this channel transition a serious head cut and upstream gully would form. A stream longitudinal profile revealed that there is a 9.8' difference in channel depth (thalweg) from the bottom of the pool below the pipe to the inlet elevation. Placement of these large boulders as a step down channel to control delivery of the stored sediment would also allow passage of aquatic species and protect the aquatic habitat downstream.

One or two railroad flat-cars will be placed on abutments to form the running surface of the road. These metal surfaces will be decked with wood (2X6 inch planks) to provide a safe driving surface. A 4X6 inch riser would be placed on the outside edges of the flatcar to prevent tires from sliding off the edge. Abutment structures of wood or concrete would be established outside the wettable stream margin.

Water in the creek at the time of construction (end of July through September) will be routed around the site through a combination of checkdams, pumps and a flexible, small diameter culvert. A sediment containment structure will be placed downstream to settle turbid water from the project area prior to release back into Boulder Creek. All disturbed areas associated with construction of the abutments will be covered with seed and a one inch layer of straw mulch to reduce erosion from rainfall events. Equipment that would be needed for the proposed project include: track-mounted excavator, rubber-tired backhoe and dump truck.

Non-Discretionary Activities associated with the Proposed Action

The proposed project would require the use of a donor site for rock material and a stable waste area for the excavated fill material. Rock material, 34 inches maximum size (Class 6), would be obtained from a private quarry and the fill material would be disposed of locally at a stable waste on private land. The exact location of the donor and waste site would be left to the discretion of the private party, South Coast Timber Company.

Additional Design Features and Conservation Practices

- ✧ proposed project would comply with the necessary conditional use permit and with the Corps of Engineers Fill-Removing permitting process, and
- ✧ any in/near stream work involving heavy equipment is subject to State and Federal Law governing petroleum spill prevention and cleanup. These include Oregon Administrative

Rules (OAR) 340, Division 108, Oil and Hazardous Materials Spills and Releases (DEQ), and OAR 629-57-3600, Petroleum Product Precautions, and Oregon Forest Practices Act.

- ✧ proposed project and its construction activities would be in conformance with the Oregon Forest Practices Act and the Oregon Plan for Salmon and Watersheds.

Alternatives Considered but Not Analyzed

Several viable alternatives were considered for analyzation but dismissed, since they did not meet the discretionary preference of the private land owner. South Coast Lumber Company possess the flatcar-style bridge so a culvert design was not practical or economical. Stream crossing structures that were considered but not analyzed are as follows:

Description - Open Bottom Arch w/ stable rock bottom

This alternative would replace the undersized existing culvert with an open bottom arch structure. This type of culvert maintains a natural substrate bottom, which should provide passage for all aquatic organisms. Juvenile fish and other aquatic organisms would move between the rocks which provide protection and points of low velocity. A 18’ by 9’ open bottom arch with concrete footings would be employed at the Boulder Creek road crossing site in order to achieve stream simulation and a 3’ head depth for debris movement.

Description - Pipe Arch w/ baffles

The second alternative would replace the undersized existing culvert with a pipe arch with baffles. This type of culvert with roughening baffles is designed to retain substrate which creates a "natural" channel for movement of all species. Small fish and aquatic organisms would move behind, between, or within the substrate collected in the pipe. A 17’ by 11’ pipe arch with baffles would be used at the Boulder Creek road crossing site in order to achieve stream simulation and a 3’ head depth for debris movement.

SECTION III - AFFECTED ENVIRONMENT

This section describes the environmental components that may be affected by the Proposed Action or No-action alternative being analyzed. This section does not address the environmental consequences, but rather acts as the baseline for comparisons in Section IV - Environmental Consequences.

Location

In the Southern Oregon Coastal area, Boulder Creek is located 2 miles east of US Highway 101 on Euchre Creek Road. The project is located approximately $^{1}/_{2}$ miles from the confluence of Boulder Creek and Euchre Creek. The legal description of the project area is: Township 35 South; Range 14 West; Section 10.

Aquatic Habitat/Fisheries, Including T & E Species - Issue 1

Boulder Creek is a 4th-order, fish-bearing tributary to Euchre Creek. The condition of the aquatic habitat and salmonid fish populations in the Euchre Creek subwatershed are described in the Euchre Creek Watershed Assessment (1994) and the most recent ODFW stream habitat inventory (1995). In summary, this information indicates that the lower half of Euchre Creek is severely aggraded, due to sediment delivery associated with mass wasting and gully erosion, primarily during major storm events in 1964 and 1972. Aquatic habitat within Euchre Creek is characterized by sparse LWD cover, low pool frequency, inadequate pool depth, high turbidity, and high stream temperatures. The Euchre Creek Watershed Assessment (1994) also indicated that access to spawning and rearing habitat is encumbered by culverts. Euchre Creek supports populations of fall chinook, coho, steelhead, and cutthrout trout. According to ODFW (Gold Beach), there are approximately 17 miles of anadromous salmonid habitat in the Euchre Creek subwatershed. Anadromous access on Boulder Creek is limited [at least during certain flows] to the lower 0.54 miles by the culvert at the 35-14-10.0 road crossing. Upstream of this culvert is another 0.10 miles of low-gradient (approximately 2%) habitat, then a transition to a moderately high-gradient (7%) reach.

Euchre Creek is not currently listed (303d) as water-quality limited. However, the Euchre Creek Watershed Assessment (1994) cites data indicating serious problems with low dissolved oxygen, high suspended sediment, and high summertime temperature. Furthermore, South Coast Watershed Council monitoring data from 1995 & 1998 indicate 7-day average maximum water temperatures in excess of 70° F in mainstem Euchre Creek and two major tributaries (Pea Creek and Cedar Creek). Monitoring data from Boulder Creek (including the project area) indicate that this Euchre Creek tributary offers important cold-water refuge, with 7-day average maximum water temperatures of 57 -58° F.

The Boulder Creek stream crossing and proposed project location are within the 100-year floodplain on private industrial timber land managed by the South Coast Lumber Company. The BLM and USFS manage lands in the headwaters of Euchre Creek and its tributaries. However, there are no fish-bearing streams on federally-managed lands upstream or downstream of the project area.

Soils - Issue 2

The Boulder Creek project area is underlaid by Otter Point geology. This type of geology produces a stream bed that is inherently gravel-rich compared with stream systems in other regions of Oregon. Annual sediment probably exceeds averages for Central and North Coast rivers by one or two orders of magnitude (Wilson, 1994). Major storms in the past, show widespread mass failures and gullying that contributed large volumes of sediment to streams on the photos of 1964 and 1972.

Hydrology

Boulder Creek is a small southern named tributary to Euchre Creek, having it's confluence at rivermile 2.8. The drainage area at the road crossing site on Boulder Creek is approximately 2.1 mi.^{2}. The orientation of the small watershed is generally north, being bounded on the west by Cedar Point and to the south by Brushy Bald Mountain. Elevations range from 200-2500 feet. The stream is third order and flows within an alluviated canyon. The streamtype is the lower portion of the stream is B4, except where the existing road and culvert have caused local stream slope flattening and converting toward a C4 streamtype (Rosgen 1996).

Drainages are known to have high runoff in southern Oregon along the Siskiyou front; usually about 2x the normal flow volume (Wilson,1994). Euchre Creek is estimated to have a peakflow of 416 cfs mi.^{2}, for a 100 year return interval event at 90% confidence, and 874 cfs in Boulder Creek at the road crossing site (Adams et al., 1986). The existing culvert is severely undersized and can only pass about 375 cfs (little more than a bankfull flow) before ponding streamflow on the road fill.

Vegetation, Including T & E Species

No Special Status or Survey & Manage botanical species are known to occur at the site or near the site. On May 13, the portion of Boulder Creek above and below the culvert was surveyed for mosses, lichens, fungi, and vascular plants. Based on the habitat and geographical location, rare vascular plant and moss species were of most concern. This riparian habitat is dominated by red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), myrtlewood (*Umbellaria californica*), and willow (*Salix sitchensis*) species. The understory has abundant cover of willow *(Salix* species), raspberries/blackberries (*Rubus species*), and current (*Ribes sanguineum*). No Special Status or Survey and Manage botanical species were found above or below the culvert. A map of the route and a list of all species encountered along the route can be found in the analysis file.

Wildlife, Including T & E Species

The project area is within the riparian area of Boulder Creek. It has no BLM land use allocation because it is privately owned. The area has been heavily impacted by logging and road building. All large conifers have been harvested from the immediate project area. BLM owns unsurveyed suitable Marbled Murrelet habitat approximately .75 mile east of the project site. Aerial photos do not indicate any Marbled Murrelet occupied sites or suitable habitat within .25 mile, and a field check on 12 May 1999 confirmed this conclusion. There is no known Northern Spotted Owl activity center or critical habitat for Northern Spotted Owls or Marbled Murrelets within five miles.

The proposed site falls within the Del Norte salamander species range and suspected range for several Survey & Manage (S&M) terrestrial mollusk species. A cursory inspection of the site revealed no Del

Norte salamander or terrestrial mollusk concerns. The habitat search and succinct species survey was conducted 100' in all directions from the culvert. No suitable habitat for Del Norte salamander was located. Terrestrial mollusks in the area should not be adversely affected since minimum canopy cover removal and additional soil disturbance is expected to occur.

Port-Orford Cedar

The BLM has no land ownership at the project location and does not control road 35-14-10.0. The road involved in the Proposed Action is controlled by South Coast Lumber Company and is currently gated at the beginning off of Euchre Creek Road. The road crossing for the project site is located at milepost 0.75 and there is no Port-Orford Cedar (POC) within the immediate project area where ground disturbing activities would occur.
Boulder Creek road was surveyed for POC and Port-Orford cedar root rot *Phytophthora lateralis* (PL) presence. POC was found at milepost 0.7, 0.8, and 1.1 miles and no *PL* was found. South Coast Lumber Company has hauled timber on the Boulder Creek Road during the wet season. The road surfacing on this road is rocked, but there are areas where the subsurface has bled through during heavy haul. Boulder Creek is likely to be infected with PL spores because of infections within the drainage (see analysis file).

Noxious Weeds

The Boulder Creek site is located off of Highway 101, which provides the source of access for all principal users of the area. Of great concern is the presence of at least 46 non-native species with significant populations of Oregon State listed noxious weed species such as: Scotch and French Broom (*Cytisus* sp.), Gorse (*Ulex europaeus*), Tansy Ragwort (*Senecio jacobaea*). The most dominate species in the area is Scotch Broom, which occurs in populations ranging from light satellite centers immediately within the area of the proposed bridge to heavy continuous stands interspersed from Gold Beach north to the site.

Oregon Department of Agriculture (ODA) has an aggressive Gorse eradication program in place for several years, however, a large population source spreads from north of the area along US Hwy 101. In cooperation with ODA, the USFS and BLM have biologically treated local Gorse populations with the gorse spider mite (*Tetranychus lintearius*). Additionally, tansy ragwort has been inoculated with the tansey flea beetle (*Longitarsus jacobaeae*).

Other non-native species of the area include but not limited to: Foxglove (*Digitalis purpurea*), Himalayan Blackberry (*Rubus discolor*), and Beach Grass (*Ammophila arenaria*). The fertile soils and forgiving climate are very conducive to these fast-growing, non-native species. Exotic plant species introduction to the area has been principally through vehicle travel, construction equipment, historic overgrazing, timber harvest and other ground-disturbing activities.

The area is controlled by a locked gate. However, this precludes only the "public" travel component of the area. The commercial aspect, which includes large haul truck and heavy equipment present the greatest exposure and opportunity to spread exotic plant species.

Hazardous Material

A Hazardous Materials Level I Site Survey was completed for the project area on April 1, 1999. There are no known hazardous materials with the project area.

Cultural Resources

Class I Inventory (review of project documentation and records check) showed the historic Schultz & Ainsworth mines in the vicinity of the project area. A reconnaissance survey was completed for the project area on April 15, 1999. The survey included a 300 foot stretch of Boulder Creek and did not reveal evidence of significant cultural resources.

SECTION IV - ENVIRONMENTAL CONSEQUENCES

Critical Element Evaluation of Each Alternative

This section describes the scientific and analytical basis for the comparison of the alternatives, and the probable consequences as they relate to the alternatives. The environmental consequences to critical elements of the human environment are outlined in the Table 1 below.

Critical Element of the Human Environment	Present in the Project Area	Affected By:	
		No Action	Proposed Action
Air Quality	Yes	No	No
Area of Critical Environmental Concern	No	N/A	N/A
Cultural Resources	No	No	No
Farm Lands	No	N/A	N/A
Flood Plain	Yes	Yes	Yes
Native American Religious Concerns	No	N/A	N/A
Noxious Weeds	Yes	Yes	Yes
Port-Orford Cedar	No	No	No
Threatened & Endangered Species (Wildlife)	No	N/A	N/A
Threatened and Endangered Species (Botanical)	No	N/A	N/A
Wastes; Solid or Hazardous	No	N/A	N/A

Critical Element of the Human Environment	Present in the Project Area	Affected By:	
		No Action	Proposed Action
Water Quality; Drinking Water	Yes	Yes	Yes
Wetlands/Riparian Reserves	Yes	Yes	Yes
Wild and Scenic Rivers	No	N/A	N/A
Wilderness	No	N/A	N/A

Air quality is unaffected by the No-action and Proposed Action alternatives. The following elements are affected by either the No-Acton or Proposed Acton alternative: flood plains, noxious weeds, water quality, and riparian reserves.

Evaluation of Consistency with Euchre Creek Watershed Assessment - Proposed Action

The Euchre Creek Watershed Assessment (Wilson, 1994) cites "adult fish blockages (culverts)" and "adult and juvenile fish blockages (culverts)" as factors contributing to poor fish spawning and rearing habitat. Project recommendations in this assessment include: "Increase juvenile and adult migration by replacing culverts causing fish passage problems or creating step pools and ladders to use existing culverts." Although the Boulder Creek culvert is not specifically addressed in the ECWA, the objective of the Proposed Action (to restore access for salmonids to a portion of their historic range) is consistent with the recommendations of the assessment.

Evaluation of Consistency with Northwest Forest Plan Standards and Guidelines - Proposed Action

The project site is private industrial timberland. The Northwest Forest Plan does not establish direction or regulation to state, tribal, or private lands (Interagency, 1994). The following information is provided for informational and not decision purposes.

The BLM and USFS manage lands in the headwaters of Euchre Creek and its tributaries. However, there are no fish-bearing streams on federally-managed lands upstream or downstream of the project area. There are no relevant Northwest Forest Plan Standards and Guidelines for discretionary actions by federal agencies on private land. Nonetheless, the design would be in accordance with the RF-4 guidance, which states that "...existing culverts, bridges and other stream crossings determined to pose a substantial risk to riparian conditions will be improved, to accommodate at least the 100-year flood, including associated bedload and debris," and the RF-6 guidance to "provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams"(p. C-33).

Evaluation of Consistency with the Aquatic Conservation Strategy - Proposed Action

Although the project site is private industrial timberland, and there are no relevant Aquatic Conservation Strategies (ACS) standards for discretionary action by federal agencies on private land, the project is consistent with ACS objectives as discussed below.

There are four components of the Aquatic Conservation Strategy: Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration (ROD, page B-12). The Proposed Action meets these four components by:

- ✧ the relevant watershed analysis is the Euchre Creek Watershed Assessment (Wilson, 1994),
- ✧ Euchre Creek is not within a Key Watershed. There are no designated Key Watersheds in the Humbug-Nesika Frontal - the relevant 5th field watershed,
- ✧ watershed restoration in the Euchre Creek analysis area is addressed in the Euchre Creek Watershed Assessment (Wilson, 1994). To date, only a portion of the identified restoration work has been accomplished (LWD placement - Boulder Creek). Although the Boulder Creek culvert is not specifically addressed in the ECWA, the objective of the proposed action (to restore access for salmonids to a portion of their historic range) is consistent with the recommendations of the assessment, and
- ✧ the project site is private industrial timberland. The BLM and USFS manage lands in the headwaters of Euchre Creek and its tributaries, but there are no Riparian Reserves or other federally-managed lands in the immediate vicinity of the project site.

Appendix B shows the relationships among the nine Aquatic Conservation Strategy (ACS) objectives, the measurable factors/indicators developed by National Marine Fisheries Service, and site-specific impacts of the Proposed Action.

ENVIRONMENTAL CONSEQUENCES ON THE NO-ACTION AND PROPOSED ACTION ALTERNATIVE

NO-ACTION ALTERNATIVE

Aquatic Habitat/Fisheries, Including T & E Species - Issue 1

Direct and Indirect Effects

FISH PASSAGE
Under the No-action Alternative, the culvert at the 35-14-10.0 road crossing would continue to present a barrier to "areas critical for fulfilling life history requirements of aquatic species" (Interagency, 1994). During summer, the 6-8’ drop at the culvert outlet would continue to limit dispersal of juvenile salmonids and restrict access to important cold-water refuge habitat in Boulder Creek. During winter, velocities within the culvert, or the drop at the outfall (both of which vary with flow), may prevent adult anadromous salmonids from accessing suitable spawning habitat in Boulder Creek.

TURBIDITY
Under the No-action Alternative, turbidity from in-channel and out-of-channel sources is likely to continue within approximately the present range. The 35-14-10.0 road is presently open to traffic; the proposed action would not change the road use. There is low potential for sediment delivery/turbidity to Boulder Creek to increase above existing [high] levels. Depending on the timing and magnitude, turbidity may result in disruption of normal behavior patterns, injury or mortality of salmonids (Newcombe & McDonald, 1991).

SEDIMENT & LARGE WOODY DEBRIS ROUTING
Under the No-action Alternative, the culvert would remain in place for the foreseeable future. This culvert has altered the transport of sediment, as evidenced by the substantial deposition immediately upstream of the inlet. Furthermore, the culvert is not adequately sized to accommodate LWD routing or 100-year stream flows. Thus, there is the potential for the culvert to plug during a storm event, resulting in mobilization of the entire fill and the sediment that has accumulated upstream. Such an event would probably compromise the recent aquatic habitat enhancement work that has occurred immediately downstream of the culvert.

Cumulative Effects

FISH PASSAGE
The cumulative effects of reduced habitat availability on fisheries resources include depressed populations, diminished productivity, and reduced species viability. The species most likely to be affected are winter steelhead, cutthroat trout, and [to a lesser extent] fall chinook.

TURBIDITY
Cumulative effects of past land management (including harvest, salvage, and road construction) have already contributed to the "at risk" status of fish stocks and poor stream habitat condition in Boulder Creek. There is a risk of additional impact to fish populations as a result of chronic turbidity in Boulder Creek.

Soils - Issue 2

Direct and Indirect Effects
If the current situation continues to exist, passage of sediment and large woody material will not pass through the stream system in a balanced manner. Continued buildup of gravels will occur on the inlet side and scour on the downside of the pipe. Some smaller sized gravels will pass at higher flows while the larger cobble and boulder sized rocks will settle out on the lower gradient above the inlet. The risk for plugging will remain as the grade above the culvert, tree species and tree age are conducive to depositing larger movable materials in the stream system. If a diversion were to occur it is likely that the distance would be minimal.

Cumulative Effects
Continued depositition and movement of small to medium sized gravels in the lower end of the channel will occur in the stream. Each time a runoff event reaches the energy necessary to mobilize the particle size in the streambed it will be routed downstream. This will be a constant process that is not normal in streams of this size. Larger rocks normally provide the armor layer needed for streambed protection and the turnover rate of the sediment would be confined to the runoff events that would be necessary to move the bigger particles. Woody materials downstream may not become embedded in this situation and sediment export would be higher than expected

Hydrology

Direct and Indirect Effects
The undersized culvert and road fill will continue to act as a control causing stream adjustments upstream toward a flatter, more meandering channel, with much fine and coarse sediments deposited as bars. High

flows above bankfull stage will pond against the road fill. Peak flows may overtop the road and cause road failure, including an initial floodwave and release of fine and coarse sediments to downstream reaches. Floatable debris may plug the culvert at lessor flows and cause road failure, if not maintained.

Cumulative Effects
The risk of dam break flooding and sediment pulses from failures due to anthropogenic features would be increased . Gravels may become imbricated with fines and pool space may be lost in lower Boulder Creek to below the confluence with Euchre Creek, depending on flow, stream slope, width and substrate.

Vegetation, Including T & E Species

Direct and Indirect Effects
If the culvert remains, sediment would continue to build-up in Boulder Creek. Trees and willows and some shrubs would slowly continue to colonize the new habitat created by an annual deposition of sediment. These plants provide shade, habitat for epiphytic liverworts, mosses, lichens, and ferns, and habitat for certain wildlife species. However, continual deposition of sediment would lower the rate of establishment, especially for herbaceous plants, potentially lowering botanical diversity at the site.

Cumulative Effects
The continual build-up of sediment from the No-action alternative would lower botanical diversity because many plants cannot thrive in a dynamic system.

Wildlife, Including T & E Species

Direct and Indirect Effects
Passage for many aquatic species would continue to be impeded. Beaver and culvert conflicts could occur in the future should dam construction occur at the culvert. No increase in bat roosting or swallow nesting sites would occur.

Port-Orford Cedar

The road stream crossing is presently in existence and limited traffic uses this road year round. PL infections on private lands will continue to provide a source of new infections at the current rate of spread. There is no POC within the immediate project area and Boulder Creek is currently infected with PL spores from upstream infection sites. The No-action alternative has no direct, indirect, or cumulative effect on the viability of Port-Orford cedar as a species.

Noxious Weeds

Direct and Indirect Effects

The No-action alternative has direct and indirect effects on the additional spread of non-native invasive populations. Current invasive species numbers will continue to expand if left un-checked. These species tend to favor disturbed sites and will increase as surface disturbing activities occur. Human travel and hydrologic patterns will continue to provide the principal means of spread for invasive species.

Cumulative Effects

Populations of noxious weeds and other non-native aggressive plant species adjacent to roads and water sources will spread throughout the watershed. The spread of non-native species may involve remote locations which are more difficult to detect, leading to a greater contamination of the overall plant community health and diversity.

The following conservation practices are suggested to prevent the spread of noxious weeds:

- ✧ follow standard noxious weed prevention practices such as (but not limited to) removing weed populations located on site and along primary access to the site for a distance of 1 mile prior to construction and wash all equipment before coming on site.

Hazardous Materials

There are no environmental consequences for hazardous material under the No-action alternative.

Cultural Resources

There are no environmental consequences for cultural resources under the No-action alternative.

PROPOSED ACTION - FLAT CAR TYPE BRIDGE

Aquatic Habitat/Fisheries, Including T & E Species - Issue 1

Direct and Indirect Effects

FISH PASSAGE

The Proposed Action would replace the existing culvert [barrier] with a flatcar-style bridge, in order to restore access for salmonids to a portion of their historic range. The design is expected to provide access to both cold-water refuge habitat during the critical summer low-flow period and suitable spawning habitat during winter.

TURBIDITY

Under the Proposed Action, elevated stream turbidity is likely during construction and during the first freshet thereafter, due to suspension of fine sediments within the active channel. These are expected to be short-term pulses. The turbidity pulse during construction may stress juvenile salmonids in the

vicinity of the project. Turbidity associated with the first freshet/s subsequent to construction is expected to be within the present range of variability for the site, thus not likely to cause additional impacts to salmonids.

SEDIMENT & LARGE WOODY DEBRIS ROUTING
The bridge design would accommodate the active channel dimensions of Boulder Creek, thereby restoring sediment transport and LWD routing processes. Removing the lateral and vertical constraint imposed by the existing culvert could result in downstream sedimentation as the stream cuts its way through the sediment deposit immediately upstream of the 35-14-10.0 road crossing. Rapid mobilization and export of these accumulated sediments could overwhelm the channel downstream. However, the design also incorporates gradient-control structures to provide for the timely release of the accumulated sediment and protect the aquatic habitat in Boulder Creek.

Cumulative Effects

FISH PASSAGE
Restoring habitat access is expected to have the beneficial cumulative effect of facilitating the recovery of depressed fish populations. The species most likely to be affected are winter steelhead, cutthroat trout, and [to a lesser extent] fall chinook.

Soils - Issue 2

Direct and Indirect Effects
This project as proposed will contribute some of the stored sediment and woody material from the upper side of the project area to the lower stream reach once flows are re-established through the project area. Then the sediment regime and routing process would return to a normal functioning condition after several large flow events during the course of one winter.

Turbidity levels above Clean Water Act standards could be present during construction at the project area and downstream to the confinement and settling area. After construction, removal of stored materials will occur as the stream strives to establish a new stream grade after the removal of the culvert and fill. This will increase the level of turbidity in comparison to the background level of the stream. This increased level may have the potential to cloud the mainstem of Euchre Creek. The fine clay sediment that is present in the bulk of the Otter Point derived soils is likely to be deposited in layers throughout the streambed above the culvert inlet. As down cutting of the streambed occurs these sediments will be re-suspended in the moving water.

High levels of turbidity could be expected to occur with each precipitation and runoff event from the downcutting activity. This level of turbidity would not be outside the normal range of variation that would be expected from these land surfaces. The timing and delivery would coincide with other high levels of sediment already present in the Euchre Creek drainage.

Cumulative Effects
This drainage is presently being harvested by South Coast Lumber Company. The runoff from the harvested areas will contain higher levels of turbidity than the drainage has experienced in the recent few years during low intensity runoff events. Adding to that level by allowing this action to proceed will likely cloud the mainstem of Euchre Creek. If the mouth of the estuary is not yet open to the ocean this cloud may become visible in the lower reaches of the river system.

Hydrology

Direct and Indirect Effects
This action would maintain a natural channel width under the flat car bridge, allowing unimpeded river flows at all stages. A boulder constructed step down channel between the two adjoining channel types would prevent a serious headcut from traveling upstream and creating a gully in the existing stream channel and delivering high sediment loads downstream. Floatable debris and large wood would not be trapped by a less than bankfull width culvert or road feature.

Cumulative Effects
The natural pathways for the routing of wood and sediment would be re-established in the drainage. The stream and downstream reaches would adjust over time to a new equilibrium. The risk of dam break flooding and sediment pulses from failures due to anthropogenic features would be lessened.

Vegetation, Including T & E Species

Direct and Indirect Effects
It is anticipated that once the culvert is pulled, a large flush of sediment will be released. Trees that are not firmly rooted below the current sediment level may fall over and/or be carried downstream, thus, contributing to future habitats for some aquatic organisms. In general trees that fall would not continue to provide habitat for the epiphytes they currently support, but instead may become habitat for a new group of botanical species that prefer rotting logs. Thus, in the immediate timeframe botanical diversity would decrease at the project site. Eventually, this action would lead to a more stable riparian habitat, allowing an understory to fully develop (especially for herbaceous vegetation) and thus increase botanical diversity. The type of material used to replace the culvert should have no bearing on botanical diversity or abundance.

Cumulative Effects
In the near and long-term future, the Proposed Action would lead to creating stable riparian habitat that may better allow the establishment of trees, shrubs, and herbaceous vegetation. In this case, habitat stability may lead to higher botanical diversity which is desirable.

Wildlife, Including T & E Species

Direct and Indirect Effects
The removal of the culvert and all fill down to the natural bed will restore unimpeded passage of aquatic invertebrates and vertebrates. In-stream turbidity during construction would have some short-term negative impacts to aquatic vertebrates and invertebrates. Conflict between beaver dams and culverts would be eliminated. A flat-car type bridge offers limited opportunities to Barn and C Swallows and American Dippers as possible nesting and/or roosting areas. No substantial roosting areas to bats would occur because of the lack of thermal mass for a heat-sink. Some species of crevice dwelling bats roost in wooden bridges if conditions are suitable, however, they do not appear to use creosote soaked bridges (Cross, 1996).

Port-Orford Cedar

Direct, Indirect Effects, and Cumulative Effects

The gating of the Boulder Creek Road prevents uncontrolled road use by the public. South Coast Lumber Company has an excellent track record in maintaining gates.

The Proposed Action has no direct, indirect, or cumulative effect on the viability of Port-Orford cedar as a species. The Proposed Action will have no additional impact on the species as a whole. PL infections on private lands will continue to provide a source of new infections at the current rate of spread. There is no POC within the immediate project area and Boulder Creek is currently infected with PL spores from upstream infection sites.

The following conservation practices are suggested to prevent the spread of *PL*:

- ✧ in order to prevent *PL* spores from entering the area of site disturbance (project area) , require equipment washing prior to entering the project site.

Noxious Weeds

The Proposed Action has the same environmental consequences as the No-action alternative.

Hazardous Materials

Any instream or streamside work involving heavy equipment is subject to State and Federal Law governing petroleum spill prevention and cleanup including; Oregon Administrative Rules (OAR) 340, Division 108, Oil and Hazardous Materials Spills and Releases (DEQ), and OAR 629-57-3600, Petroleum Product Precautions, Oregon Forest Practices.

Cultural Resources

It is not expected that cultural resources will be affected by the Proposed Action.

List of Agencies

Oregon Department of Fish and Game
Department of Environmental Quality
Forest Service - Gold Beach Ranger District
South Coast Watershed Council
South Coast Lumber Company

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